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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,359	12/08/2003	Chao-Chueh Wu	11491-US-PA	1358
31561	7590	03/03/2005	EXAMINER	
JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE			LE, THAO P	
7 FLOOR-1, NO. 100			ART UNIT	
ROOSEVELT ROAD, SECTION 2			PAPER NUMBER	
TAIPEI, 100			2818	
TAIWAN			DATE MAILED: 03/03/2005	

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/707,359

Applicant(s)

WU, CHAO-CHUEH

Examiner

Thao P. Le

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 and 28-33 is/are rejected.
- 7) ☒ Claim(s) 23-27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/08/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Acknowledge is made of applicants' claim for foreign priority base on an application 92122456 filed in Taiwan on 08/15/2003.

It is noted that Applicants have filled a certified copy of said application as required by U.S.C 119, which papers have been placed of record in the file.

2. Claims 1-33 are pending.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-8, 10, 14-21, 29-33 are rejected under 35 USC 102 (e) as being anticipated by Sheu et al., U.S. Pub. No. 2005/0012173.

Regarding claims 1, 10, 21, Sheu et al. discloses a method of doping sidewall of an isolation trench, comprising the steps of: providing a substrate having first region and second region, the substrate having a plurality of trenches (Figs. 1A-1B, 2A), forming a blocking layer 18 in each trenches, etching the blocking layer to have the top surface of the blocking layer is lower than the top surface of the substrate (Fig. 3; paragraph 0034); performing a sidewall doping process to form a doped region in the substrate at the upper trench sidewall (Figs. 3, 4A, paragraph 0035-0036), and removing the blocking 18 within the trenches (Fig. 5; para 0037).

Regarding claims 2, 16, 29, Sheu et al. discloses wherein the dopants in the sidewall doping process for forming the doped region are complementary to the ones for forming a doped source/drain region in the substrate adjacent to the trenches thereafter (Figs. 5-6).

Regarding claims 3, 17, 30, Sheu et al. discloses wherein the sidewall doping process comprises an ion implantation (Fig. 3).

Regarding claims 4, 18, 31, Sheu et al. discloses wherein the ion implantation is carried out using an energy level between 5-40 KeV, a dosage between $5E12$ to $1E14$ ions/cm² and a slant angle relative to a direction perpendicular to the substrate is between 5-30° (para 0035).

Regarding claims 5, 19, 32, Sheu et al. discloses wherein the depth of the doped region in the sidewall doping process is shallower than the junction depth of the source/drain region (Figs. 3-10).

Regarding claim 6, Sheu et al. discloses wherein the step of forming the blocking layer comprises: forming a blocking layer over the substrate to fill trenches, etching the blocking layer and portions of the blocking layer remains within the trenches (Fig. 3).

Regarding claims 7, 14, Sheu et al. discloses the blocking layer is selected from photoresist (para 0034).

Regarding claims 8, 15, Sheu et al. discloses the step of forming the blocking layer comprising a spin-on coating process (par 0034).

Regarding claims 20, 33, Sheu et al. discloses a design rules shrink for MOSFET, it is inherent that the MOSFET includes NMOS and PMOS.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 9, 11-13, 22, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Sheu et al., U.S. Pub. No. 2005/0012173.

Regarding claims 9, 13, 28, Sheu et al. discloses the etching of the blocking layer is etch back process. It would have been obvious to one having ordinary skill in the art to perform either wet etch or reactive ion etching in order to etch the blocking layer to have a top surface lower than the top surface of the substrate as described in Sheu et al.

Regarding claims 11-12, it would have been obvious to one having ordinary skill in the art at the time the invention was made to either form the mask layer before or after the etching process because the functions, manner, and characteristics of the device would not be changed.

Regarding claim 22, it would have been obvious to one having ordinary skill in the art to form the blocking layer in the second region is thicker than the layer in the first region because the functions, manner, and characteristics of the device would not be changed.

Claim Objection

7. **Claim 23 would be allowed.**

Dependent Claim 23 and those claims (24-27) which depend on claim 23 are objected and would be allowable if claim 23 is rewritten as independent claim which includes all of the limitations of the base claim and any intervening claims (Dependent claim). Claim 23 is considered allowable since none of prior art teach or suggest the claimed limitations including, among other steps cited in independent claim 21, the step of forming the blocking layer in the first region is thinner than the blocking layer in the second region using nanoimprint process by pressing a mold into the material layer so that thickness of the material layer in the first region is reduced.

8. If Applicants are aware of better art than that which has been cited, they are required to call such to attention of the examiner.

9. When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao P. Le whose telephone number is 571-272-1785. The examiner can normally be reached on M-T (7-6).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Thao P. Le', with a stylized, cursive script.

Thao P. Le
Examiner
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